



CHAPTER 8

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Linux 8.1 Understanding IPV4 Networking

- In IPV4, each node needs its own IP address, written in dotted decimal notation (192.168.4.200/24)
- Each IP address must be indicated with the subnet mask behind it.
- The default router or gateway specifies which server to forward packets to that have an external destination.
- The DNS nameserver is the IP address of a server that helps resolving names to IP address and the other way around
- IPV4 is still the most common IP version, but IPv6 address can be used as well
- IPv6 address are written in hexadecimal notation
- IPv4 and IPv6 can co-exist on the same network interface

Linux 8.2 Understanding NIC Naming

- IP address configuration needs to be connected to a **specific network device**
- Use **ip link show** to see current devices, and **ip addr show** to check their configuration.
- Every system has an **lo (look back)** device, which is for internal networking
- Apart from that, you'll see the name of the real network device, which is presented as a BIOS name.
- Classical naming is using device names like eth0, eth1 and so on.
 - * These device names don't reveal any information about physical device location
- BIOS naming is based on hardware properties to give more specific information in the device name
 - em[1-N] for embedded NIC's
 - eno[nn] for embedded NIC's
 - p<slot>p<port> for NIC's on the PCI bus
- if the driver doesn't reveal network device properties, classical naming is used.

- ip addr show

Linux 8.3 Managing Runtime Configuration With IP

- manage of runtime configuration
- The **ip** tool can be used to manage all aspects of IP networking
- it replaces the legacy **ifconfig** tool, do NOT use **ifconfig** anymore
- use **ip addr** to manage address properties
- use **ip link** to show link properties
- use **ip route** to manage route properties
- **ip -s link show** also show the recieved and transfer the packets

- **ip addr add dev ens33 10.0.0.10/24** it will add the secondary ip address
- ifconfig doesn't show any secondary IP address

- **ip route show** it will show the current default router
- **ip route del default via 192.168.4.2**
- **ping 8.8.8.8** now network is unreachable
- **ip route add default via 192.168.4.2**
- **ping 8.8.8.8** now network is reachable

- **DNS** Domain Name Server -> Its is manages throught the configuration file
- **cat /etc/resolv.conf** Generated by Network manager so we can not be benifit becox when service restart it will generated again.

LINUX 8.4 Understanding RHEL 8 Networking

- What network manager is doing?
- enp0s3 is a network card which is physically connected to the computer to the network.
- There is a configuration file i.e. /etc/sysconfig/network_scripts/
- There is a network manager is a services which make sure that it si applied to the network card.

- There are **two main network interface** to work with network manager
- **nmcli -> network manager command line interface** which help us to talk with the network manager and will generate or modify the configuration file
- **nmtui -> Network manager text user interface** it will also help us to write the content to the configuration file

LINUX 8.5 Managing Persistent Networking with nmcli

- It is very power utility
- An nmcli connection is a configuration that is added to a network device
- Connection are stored in configuration files
- The networkManager service must be running to manage these files.
- Ensure that the bash-completion RPM package is installed when working with nmcli.

• **PRACTICAL**

- **systemctl status NetworkManager**
- **systemctl start NetworkManager**
- **rpm -qa | grep bash-completion**
- **man nmcli-examples** example 9

• **nmcli con add con-name my--con-em1 ifname em1 type ethernet \ ip4 192.168.1..1../24 gw4 192.168.100.1 ip4 1.2.3.4 ip6 abbe::cafe**

- **con** for connection
- **add**
- **con-name** connection name
- **ifname** which is followed by the name of the network card
- **type** type of ethernet
- **ipv4**
- **gateway**
- **ip4** to add another secondary ip
- **ip6**

- **nmcli con mod my-con-em1 ipv4.dns "8.8.8.8.8.4.4" ip6 abbe::cafe**
- **mod** modify the connection

- **nmcli connection add <name> ifname ens33 ipv4.addresses 192.168.4.208/24 ipv4.gateway 192.168.4.2 ipv4.dns 8.8.8.8 type ethernet**
- **nmcli connection show**
- **nmcli connection up ethernet-ens33**
- **ip a**

Linux 8.6 Managing Persistent Networking with nmtui

- It is powerful but it's not the easiest utility to use.
- If you are looking for a utility to do it quick and easy so nmtui is the best choice for this.
- **nmtui** press enter
- Edit a connection
- <add>
- Profile name - connection name
- device name is the mac address
- ipv4 configuration automatically set
- if you will not put the subnet mask after the ip address the by default 32 is used

- Activate a connection pressed press enter and enter again
- Set system hostname (server name)
- ip a
- Now dynamic ip configuration is gone

LINUX 8.7 Verifying Network Configuration Files

- `cd /etc/sysconfig/network-scripts/`
- `ls -> ifcfg-ens33 efcfg-ehernet-ens33`
- `vim efcfg-ehernet-ens33`
- `TYPE=ethernet`
- `PROXY METHOD=none`
- `BROWSER ONLY=no`
- `BOOTPROTO=name`
- `IPADDR=192.168.4.208`
- `PREFIX=24`
- `GATEWAY=192.168.4.2`
- `DNS1=8.8.8.8`
- `DNS2=8.8.8.4`
- `DEFROUTE=yes`
- `IPV4 FAILURE FATAL=no`
- `IPV6INIT=yes`
- `IPV6 AUTOCONF=yes`
- `IPV6 DEFROUTE=yes`
- `IPV6 FAILURE FATAL=yes`
- `IPV6 ADDR GEN MODE=stable-privacy`
- `NAME=ethernet-ens33`
- `UUID=a42d.....`
- `DEVICE=ens33`
- `ONBOOT=yes`

LINUX 8.8 Testing Network Connections

- ping [google.com](https://www.google.com)
 - ping -c 1 [google.com](https://www.google.com)
 - ping -f [google.com](https://www.google.com) tell us network loss
 - ip addr show show current configuration
 - ip route show shows current routing table
 - dig can test DNS nameserver working
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- ping [google.com](https://www.google.com) : name or service not know
 - ping 8.8.8.8 : network is unreachable
 - ip route show bydefault router is missing
 - ip addr show
 - ip route add default via 192.168.4.2
 - ip route show
 - !p last history command
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- If some time the gateway error then ,
 - cat /etc/sysconfig/network-scripts/ifcfg-ethernet-ens33
 - GATEWAY=192.168.4.2 it is setted properly
 - if the gateway set is not properly
 - nmcli connection up ethernet-ens33 it will activate the connection successful
 - ip route show

The background is a blue gradient with decorative white circuit-like lines in the corners. The lines consist of straight segments and small circles, resembling a stylized electronic circuit.

Thank You